Elevated Systemic Fasting and Post-Prandial Glucagon-Like Peptide 1 in Patients With Symptoms of Nausea and Vomiting Following Surgical Weight Loss

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BACKGROUND

• Glucagon-like peptide-1 (GLP-1) is a gut peptide secreted by L cells which are located in small intestine. Baggio L & Drucker DJ 2007 (Fig 1).
• It has important actions in mediating satiety and promoting insulin sensitivity and improved glucose metabolism. Pourmaras D & Le Roux C 2009
• Postprandial GLP-1 following Roux en Y Gastric Bypass (RYGB), and gastric banding (GB), have been shown to be significantly higher compared to pre-operative levels, sustained over at least a year and associated with enhanced satiety and maintaining of insulin sensitivity. Falken Y ea al 2011
• The causes of high GLP-1 levels after RYGB or GB is not fully understood but may be, at least partly, due to most L cells being located in distal part of the small intestine (ileum) and bypassing the foregut, as with RYGB, makes the ingested nutrients reach the proximal part of intestine more readily.

DISCUSSION OF RESULTS

METHODS

• Study population: Female patients following surgery for weight reduction with (n=10) or without (control group, n=10) persistent symptoms of nausea.
• Study day: Patients attended following an overnight fast. Anthropometric data were recorded (age, height and weight, body mass index, blood pressure) and blood obtained prior to and following a meal (180kcal) at 45, 120, and 180 minutes.
• Sample collection: Blood was collected from the antecubital vein.
• Analysis: The serum/plasma were analyzed for GLP-1 (commercial ELISA, R&D Systems, UK), glucose, and insulin (commercial ELISA; Mercodia, Sweden) at basal and postprandial stages (45m, 120m and 180m), and total-cholesterol, HDL-cholesterol, LDL-cholesterol and triglycerides in the fasting samples only.

RESULTS

• Both groups showed significant and comparable weight loss following surgery (Fig 2).
• Change in plasma total cholesterol, LDL, HDL, triglyceride (Fig 3), as well as glucose (Fig 4A) were not significantly different between the groups.
• While basal insulin levels are similar, the first phase response (45 minutes) was lower in the symptomatic group (Fig 4B).
• However, basal and postprandial GLP-1 levels were higher in the symptomatic group, compared to asymptomatic group, as ascertained by area under the curve (Fig 4C).

CONCLUSIONS

• Exaggerated GLP-1 responses are associated with excessive nausea and vomiting symptoms in a subset of patients post GB.
• Symptomatic patients may benefit from GLP-1 antagonist therapy, such as Exendin (9-39), to alleviate their symptoms.

Table 1. Ethnic mix of the study population.

<table>
<thead>
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<th>Ethnicity</th>
<th>Patients with n&amp;v</th>
<th>Patients without n&amp;v</th>
</tr>
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<tr>
<td>Age (years)</td>
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<td></td>
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